



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/066,638	02/06/2002	Masashi Ando	Q67810	6088

7590 10/24/2003

SUGHRUE MION, PLLC
2100 Pennsylvania Avenue, NW
Washington, DC 20037-3213

EXAMINER

OLSEN, KAJ K

ART UNIT	PAPER NUMBER
----------	--------------

1753

DATE MAILED: 10/24/2003

11

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/066,638

Applicant(s)

ANDO ET AL.

Examiner

Kaj Olsen

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-23,39 and 42-56 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-20,22,23,39,42-46,48-52 and 54-56 is/are rejected.
- 7) ☒ Claim(s) 21,47,53 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 9,10.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 16, 19, 20, and 39 are rejected under 35 U.S.C. 102(b) as anticipated by Kato et al (SAE paper no. 970,858) (hereafter "Kato '858").

3. With respect to the claims 16 and 19, Kato '858 sets forth a method for detecting the concentration of a specific component (NO_x) in an exhaust gas. Kato '858, discloses calibrating the output of the sensor with respect to the concentration of the NO_x being measured, including a zero point for NO_x concentration (fig. 2a, 3 and 4). Once the response of the sensor is determined with respect to the NO_x concentration, the calibration data points (including the zero point) are utilized to fit the sensor's current response to a line. This line would then be utilized for the determination of the concentration of NO_x in all subsequent measurements. Hence Kato '858 teaches detecting the concentration of the specific component based on the calibrated detection output.

4. With respect to claims 20 and 39 (those limitations not already discussed above), see fig. 1 and the discussion of fig. 1 on p. 200.

5. Claims 16-18, 22, 23, and 42-44 rejected under 35 U.S.C. 102(b) as being anticipated by JP publication 04-116,241.

Art Unit: 1753

6. JP '241 discloses a method for detecting the concentration of an exhaust gas using a gas sensor where a zero point for the sensor is determined for the specific component of the exhaust gas (i.e. hydrocarbons) and detecting the concentration of that specific component after the detection output has calibrated (see abstract). Said zero point is determined under fuel cut conditions.

7. Claims 22 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Itsuji et al (USP 4,676,213).

8. Itsuji discloses a method and apparatus for detection specific component in an exhaust gas (O₂) using a gas sensor. Itsuji teaches calibrating the sensor response by measuring the detection output at a particular condition (i.e. when the fuel has been cut to the engine (col. 10, lines 44-51)). Under said fuel cutting, the oxygen exposed to the sensor goes to substantially the same level as the oxygen in the atmosphere (i.e. it becomes a known condition) (fig. 11). Based on said detection output, the calibration for the sensor response is changed for the entire sensor operating range.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various

Art Unit: 1753

claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 17, 18, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kato '858. In the previous office action, the examiner had included the rejection of these claims under the previous 102 rejection as being as being rejected under 102 or 103. The examiner's use of the 102/103 was meant to convey that some claims were being rejected as being anticipated under 102 while other claims were obvious under 103 (which would be evident from the fact that some claims had motivation statements while others did not). For clarity, the examiner is now listing the rejections of claims 17, 18, 22, and 23 (i.e. the claims deemed obvious over Kato) separately from the claims that were deemed anticipated by Kato.

12. With respect to claims 17 and 18 (those limitations not covered above), Kato '858 teaches calibrating the sensor under a number of conditions including specifically at a rich air/fuel ratio (fig. 4b). Although Kato '858 does not explicitly recite the calibration procedure as occurring during a fuel cut procedure (although presumably the fuel was cut when the vehicle speed in fig. 7 was decelerating or was zero), one possessing ordinary skill in the art would recognize that cutting the fuel supply is one manner of arriving at a zero concentration point for NO_x because the NO_x concentration principally stems from the NO_x released by consumed fuels and in the absence of those fuels would result in negligible levels of NO_x (notice how the NO_x

Art Unit: 1753

concentration goes to zero in fig. 7a whenever the vehicle is being decelerated or stopped in fig. 7c).

13. With respect to claims 22 and 23 (those limitations not already discussed above), although Kato '858 does not explicitly set forth what driving conditions contributed to the zero points shown in fig. 2a, 3 and 4, one possessing ordinary skill in the art would clearly recognize that during deceleration or stopping of the vehicle, NO_x concentration would be zero because the NO_x concentration principally stems from the NO_x released by consumed fuels and in the absence of those fuels would result in negligible levels of NO_x (notice how the NO_x concentration goes to zero in fig. 7a whenever the vehicle is being decelerated or stopped in fig. 7c).

14. Claims 42-46, 48-52, 55, and 56 rejected under 35 U.S.C. 103(a) as being unpatentable over Kato '858 in view of Harris (Quantitative Chemical Analysis, Fourth Edition, pp. 71-73 and 137-139, 1995). Harris is being cited and utilized for the first time with this office action. Its use was necessitated by these new claims.

15. Kato set forth all the limitations of these claims (see rejection above), but did not explicitly recite a step of calibrating the detection output of the sensor based on the zero point. Harris teaches how calibration data can be utilized for the determination of a calibration curve in two ways which render obvious the use of the zero point for the calibration. First, Harris teaches that a linear calibration curve (which Kato would presumably utilize given the linear response of the sensor) fits to $y = mx + b$, where m is the slope of the calibration line and b is the y-intercept (p. 72). Hence, for determining a calibration curve, one must either know the y-intercept point or be able to calculate it from the calibration data. In the case of Kato, Kato does measure the zero-

Art Unit: 1753

point (it is 0 μm). In this sense, the calibration of Kato would take into consideration the zero-point measured by Kato because the y-intercept is one of the two numbers necessary for the determination of a calibration curve. Second, Harris also teaches that the slope m of the calibration curve can be determined by mathematical operations on the various data points (equation 4-14 on p. 73). Because one of the calibration points (i.e. x_i and y_i in Harris lingo) measured by Kato is the zero point, that zero point in the calibration would be utilized for both the determination of the slope and intercept of the calibration curve. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Harris for the calibration curve of Kato because the use of known means for generating calibration curves requires only routine skill in the art.

Allowable Subject Matter

16. Claims 21, 47, and 53 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

17. The following is a statement of reasons for the indication of allowable subject matter: the prior art does not disclose calibrating the zero point while the air-to-fuel ratio is temporarily set to a rich side for cleaning NO_x occluded in said NO_x occlusion catalyst.

Response to Arguments

18. Applicant's arguments filed 8-4-2003 have been fully considered but they are not persuasive. With respect to the rejections relying on Kato '858, applicant urges that Kato '858

Art Unit: 1753

does not disclose calibrating the sensor in atmospheric air. Rejected claim 16 does not require the calibration be done in atmospheric air, but just in an "atmosphere". There is nothing inherent in "atmosphere" by itself that limits the term's usage to atmospheric air. Rejected claims 17 and 18 only state that the specific component be at the same level as that of the atmosphere (again, this is just "atmosphere", not "atmospheric air"). If NO_x is at 0 ppm in atmospheric air, then the 0 ppm of Kato reads on the limitations of the claim. With respect to claim 39, the examiner points out that fig. 7 and 8 show the sensor operating under atmospheric conditions (particularly at points where the fuel is cut and the NO_x measurement goes to zero). Moreover, the conditions that Kato is being tested under in fig. 2a and 2b are model gas compositions that appear to simulate atmospheric air conditions (p. 201). The examiner sees nothing in the claim, nor any patentable distinction even if it were in the claim, which would distinguish between real atmospheric air and a gas simulated to approximate atmospheric air.

19. Applicant also urges that Kato '858 does not disclose calibrating the sensor while operating an internal combustion engine. First, a number of the originally rejected claims do not specify anything about the calibration being done while operating an internal combustion engine. Moreover, applicant appears to be overlooking fig. 5 (a) and (b) which is showing the sensor being calibrated on an actual internal combustion engine. If the fuel is cut during the calibration (look at the calibrations being shown on fig. 7 and 8 where there are a number of point where fuel would have been cut (e.g. during decelerations)), then those points when the fuel would have been cut would have been zero points in atmospheric air.

20. Applicant also urges that Kato '858 does not disclose any "zero point" calibration as defined by the present invention. Applicant bases this conclusion on the fact that linear lines of

Art Unit: 1753

Kato's calibration cross the zero-ordinate point. Although applicant is correct in its summation of Kato, why does the fact that the calibration crosses the zero-ordinate point read free of the rejected claims? The various claims only specify (using claim 16 as the example) "determining a zero point". Kato does that. The zero point determined by Kato is 0 μ A. Where do the claims state that the zero point can't be zero? Applicant further urges that nowhere does Kato apply a zero point correction. First, the originally rejected claims do not state anything to effect of "applying a zero point correction". Using claim 16 as an example, all the claim states is after a zero point is determined, the concentration of a specific component is detected after the output has been calibrated. This says nothing about applying a zero point correction. Applicant's new claims do explicitly recite utilizing the zero point in the calibration. For these claims, the examiner has introduced the reference Harris, which renders obvious the use of the zero point for the calibration.

21. Applicant final point concerning the use of Kato '858 is that Kato only measures the sensor signal in three particular conditions, none of which were atmospheric air. First, the issue of atmospheric air was already addressed above. Second, applicant is fixating on the particular conditions utilized for the generation of fig. 4, while ignoring the conditions that were utilized for the generation of fig. 2a, 7, and 8, which all included zero-point conditions.

22. Applicant's rewording of claims 16 and 17 overcome the teaching of Itsuji. However, claims 22 and 23 do not specifying anything about zero points and these rejections have been maintained. Applicant's traversal of the rejection utilizing Itsuji only addressed the issue of zero point calibrations, so it is unclear why the applicant believes claims 22 and 23 are free of the prior art.

Art Unit: 1753

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaj Olsen whose telephone number is (703) 305-0506. The examiner can normally be reached on Monday through Thursday from 7:00 AM-4:30 PM. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner are unsuccessful, the examiner's supervisor, Mr. Nam Nguyen, can be reached at (703) 308-3322.

When filing a fax in Group 1700, please indicate in the header "Official" for papers that are to be entered into the file, and "Unofficial" for draft documents and other communications with the PTO that are not for entry into the file of this application. This will expedite processing of your papers. The fax number for regular communications is (703) 305-3599 and the fax number for after-final communications is (703) 305-5408.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, whose telephone number is (703) 308-0661.



Kaj K. Olsen
Patent Examiner
AU 1753
October 20, 2003